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MANAGEMENT OF PRIMARY HEALTH CARE FACILITIES BASED ON PERFORMANCE EVALUATION

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Abstract
The article poses a problem in consistency of approaches to the formation of a set of indicators for evaluating the activity of primary health care facilities with the informational needs of the surrounding institutional environment in new conditions. It was determined that the formation of the health care system in Ukraine currently declares a review of not only the medical, but also the institutional role of primary health care institutions, which implies the initiation of the participation of health care institutions in a global dialogue with elements of the surrounding institutional environment. The purpose of the article is a logical generalization of the key problems of domestic approaches to management and the basis assessment of the effectiveness of primary health care institutions and the development of principles for improving the assessment of institutions in interaction with the elements of the institutional environment. The essence has been studied economic and statistical evaluation methods, the most widespread in the world practice of evaluation and analysis of activities in the field of health care. A chain of forming attributes of the evaluation system has been developed, which determines the sequence of influence of each of the attributes on the final indicator. The institution's institutional environment has been structured primary health care, which is based on the possibilities of influence of individual institutions on the functions performed by the institution. The relationship between potential elements of the institutional environment and the functions of the institution is defined and summarized primary health care and the order of forming attributes of evaluation indicators, which can be used as a basis for developing a set of indicators for evaluating the health care institution's activity in a specific institutional environment.

Keywords: *health care facilities, management, activity efficiency, activity evaluation, institutional environment, indicator, evaluation method.*

JEL Codes: *M10, I18, C22.*

Introduction

The medical reforms of recent years in Ukraine have led to the appearance of a fundamentally new object of management – a communal non-profit HCF, which essentially became all state health care institutions (hereinafter referred to as HCF). Unlike private HCF, where the criterion of commercial success is embedded in the management system from the very beginning, state HCF found themselves in a situation of needing to apply efficiency criteria in their own management system out of the blue, without having any previous experience in this matter. This situation becomes particularly relevant in the case of primary health care facilities (hereinafter referred to as PHCF), which are the basis of the health care system in the country. Primary care facilities are characterized, first of all, by quantitative dominance: they are numerically the main part of HCF, the majority of health care managers work here, and the majority of state funds in this area are spent on these facilities. But, at the same time, doctors who worked in them in the pre-reform period and do not have sufficient management skills became the heads of primary care institutions. Problems of the effectiveness of

management of primary HCF predominantly cause problems of the effectiveness of management of all areas of health care in the country.

Instead, in Ukraine, it is declared that a key aspect of reforming the health care system is a review of not only the medical, but also the institutional role of PHCF, which implies the participation of primary care institutions and the surrounding institutional environment in the so-called global dialogue. This participation should go beyond the context of the provision and use of medical services and become a key factor in the realization of health as a human right.

The Alma-Ata Declaration (later the Astana Declaration) on primary health care defined that people have the right to take individual and collective participation in the planning and implementation of their health care (Declaration of Astana, 2018). The combination of the fact of the exceptional importance of primary care in people's lives and the right of people, or in a broader sense of the participants of the institutional environment in general, to influence the field of health care necessarily leads to the actualization of the problem of assessment and analysis of mutual influences in these relations.

At its simplest, institutional engagement is often seen as an intervention to improve health outcomes, rather than a process of implementing and supporting health programs to support those outcomes. Understanding the relationship between participating institutional environments and improving health outcomes requires new approaches to assessing these processes.

An urgent problem of the modern stage of medical reform in Ukraine is the change of approaches to the evaluation of the effectiveness of health care institutions, both for the purpose of improving internal management processes and for the purpose of improving interaction with the elements of the institutional environment. On the one hand, there is a desperate need for the management of primary care institutions to use simple and informative models of activity evaluation, and, on the other hand, the state has proposed extremely primitive approaches to evaluation for this purpose. There was an urgent need to improve the entire system of information and analytical support for management in primary care institutions, considering both modern domestic realities and best international experience.

The purpose of the research is a logical generalization of the key issues domestic approaches to management and the basis for evaluating the effectiveness of primary care institutions and the development of principles for improving the evaluation of institutions in interaction with elements of the institutional environment.

The object of the study is the public, public and institutional environment of the functioning of health care institutions. The subject of the study is information support for the management of HCF, which is formed on the basis of evaluating the effectiveness and efficiency of the activities of HCF.

Literature review and methodological basis

The topic of our study is relevant, but in the scientific literature it is developed fragmentarily, with a predominant emphasis on individual aspects such as performance assessment, quality management of medical services, organization of personnel work, implementation of information systems, or financing models. Systemic, integrated approaches to comprehensive management of primary health care institutions based on performance assessment are less common. As an example, the work of Mykhailichenko et al. (2021) considers competitive HR management strategies in the context of digitalization of business processes. Despite the fact that the study focuses on the agricultural sector, its approaches to digital transformation and human resource management can be adapted for primary health care, where digitalization of processes and effective staffing are key components of successful management. The study of Voznyuk et al. (2022) proposed a synergistic model of process management in the field of education using temporary autonomous management teams. Although the topic is tied to the educational environment, the principles of modeling and flexible management used have the potential for implementation in medical institutions,

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in particular in the context of optimizing primary health care management based on performance assessment. The article by Sharlovych et al. (2025) is devoted to the analysis of occupational risks and quality of life of medical workers. This study is directly relevant to the topic, since issues of staff well-being directly affect the quality of services provided in primary health care institutions, and are also key indicators in assessing their effectiveness. The work of Hnatenko et al. (2024) analyzed the Ukrainian renewable energy market in the context of changes in financial and economic processes. Although this topic is not directly related to medicine, the methodology of systemic analysis of external environment changes and approaches to assessing economic efficiency can be applied to analyze the effectiveness of management decisions in primary health care. The study by Mykhalchenkova et al. (2024) is devoted to the Ukristei information platform as an innovation hub for supporting business development. In the context of primary health care, this work can be valuable in terms of building an information infrastructure that supports management decision-making based on data and performance indicators. The article by Gažarová et al. (2025) presents an index that allows assessing the risks of metabolic disorders based on weight and waist index in women. Although it has a medical and biological nature, the study can be taken into account in the context of monitoring the health status of personnel, which, in turn, affects the efficiency of the functioning of a medical institution.

Zhyvko et al. (2024) analyzes the impact of the US stock market on the strategic security of innovative development management. Despite the macroeconomic scale of the topic, some strategic conclusions can be useful for building long-term models of primary health care development in conditions of instability. Bakhmat et al. (2022) examines the quality management system in higher education in the context of sustainable development. This approach has applications to the medical field, in particular through the analogy of creating quality assurance systems for medical services, using performance indicators and compliance with standards. Gryshchenko et al. (2023) study reveals the features of managing the environment for the development of innovative entrepreneurship in integrated structures during post-war reconstruction. In the context of the restoration of medical systems after the crisis, this work provides valuable recommendations on organizational flexibility, adaptation and integration of management functions. Bosniuk et al. (2021) focuses on the social content of the professional activities of psychologists. Its significance within the topic lies in the possibility of a deeper understanding of the psychological aspects of the work of medical personnel, which affect the level of job satisfaction, stress resistance and, accordingly, the effectiveness of their work. The work of Prokopenko et al. (2021) examines models of state management of clusters, marketing and the labor market in the context of globalization and bankruptcy risks. This work is of great importance for the topic of primary health care management, as it contains strategic management tools that can be adapted to the clustering of medical institutions, the development of regional primary care networks and the optimization of the distribution of labor resources. The article by Shumilova et al. (2023) is devoted to the formation of emotional and ethical competence of future managers in the field of education in conditions of transformations. Although not directly related to medicine, this work can be useful in understanding the importance of developing managerial soft skills in primary health care managers, especially in the context of teamwork, ethical decision-making and effective communication with medical staff and patients. In the study of Prylipko et al. (2021) models regional management of innovative activities, with a focus on personnel policy, financial and credit and foreign economic activity. This study can be used in developing a model of effective management of primary health care in a regional context, especially in terms of the formation of innovative approaches to personnel and financing. The work of Hnatenko et al. (2020) is devoted to the formation of the

infrastructure of innovative entrepreneurship in market conditions. Its significance for the topic of primary health care management lies in the possibility of transferring the concept of innovative infrastructure to the healthcare sector - for example, the formation of telemedicine platforms, analytical systems for monitoring efficiency or supporting the manager's decisions.

The article by Kubitskyi et al. (2023) focuses on the development of higher education institutions in modern conditions. It touches on issues of strategic management, adaptation to challenges, which can be a parallel to adaptive management in primary health care institutions. The experience of education in quality management and compliance with the requirements of the time is fully correlated with transformational processes in healthcare. The work of Mazur et al. (2021) considers the improvement of controlling in the financial management of enterprises. For the primary health care system, this work is valuable in terms of introducing effective financial mechanisms for controlling the use of resources, budgeting, as well as analyzing financial efficiency, which is directly related to assessing productivity.

The study by Semenov et al. (2021) analyzes the management of energy-saving innovative projects in the agri-food sector. Although the subject is agricultural, its management tools may be relevant for primary health care in the field of implementing infrastructure innovations, for example, energy efficiency of buildings or resource conservation in the work of medical institutions. The work of Purdenko et al. (2023) examines the financial management of innovative eco-entrepreneurship. Although the study concerns business, its principles of environmental and financial sustainability can be applied in primary health care, in particular when forming green initiatives, environmentally sustainable procurement or energy conservation projects.

The traditions of evaluating the effectiveness of primary care institutions in Ukraine are based on two main aspects. First, the evaluation is based on the fact that the primary care facility is an object of public administration and approaches to its evaluation should be used similar to those used in relation to all public sphere objects. In turn, such approaches, all without exception, are based on the ratio of costs and obtained results. That is, there must be a functional relationship between the indicators of costs and results. Secondly, there is an intra-industry medical approach to evaluating the effectiveness of any health care institution based on the division of evaluation indicators into three groups: indicators of medical, social and economic efficiency. The use of the division of indicators into the three specified groups leads to a key analytical problem – the difficulty of establishing the dependence of the behaviour of indicators of different groups on each other.

From a technical point of view, the easiest way to evaluate the effectiveness of primary care institutions is to form series of dynamics based on a certain indicator and further calculate the parameters of these series. The overwhelming majority of such series of dynamics are non-stationary series, which are characterized by the instability of their variation parameters. But the problem is that the vast majority of evaluation characteristics in health care institutions are semi-qualitative or qualitative, that is, non-parametric. In turn, this leads to the need to use non-parametric methods of performance evaluation, which ultimately makes it much more difficult to establish the relationship between the behaviour of individual indicators and draw conclusions for the purpose of regulation or management.

With this in mind, information panels or dashboards for the analysis of the activities of primary care institutions represent a collection of a large number of indicators that are independently significant, but do not meet the requirements of the management system of these institutions.

In world practice, there is a similar problem that the estimated characteristics are non-parametric and the series of dynamics they form are non-stationary. In order to solve this, in global practice, more complex economic and statistical evaluation methods are used in the quantitative assessment of the effectiveness of primary care institutions, which most often include: the input data envelopment analysis method (DEA), the Malmquist index calculation model, and the “Tobit” model. The last

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two are rather ways of clarifying and supplementing DEA. These are non-parametric approaches that give a relative estimate, always dependent on a certain point of comparison.

Data Envelopment Analysis (DEA) is a non-parametric approach that uses linear programming to construct a stepwise linear segmentation performance bound based on best practices (Hollingsworth, 2003; Hollingsworth et al., 1999). From a methodological point of view, DEA is a method of studying the relative efficiency of similar decision-making blocks with several inputs and outputs in the traditional sense of the inputs and outputs of the production function. Nonparametric methods do not operate with predetermined parameters of the production function, but, instead, allow you to determine the marginal production functions, which are used to calculate the maximum achieved ratio of inputs and outputs for each object of analysis.

DEA has become an effective tool for measuring health care performance since the mid-1980s and has been widely used over the past two decades (Pelone et al., 2015). The objects of evaluation, in the case of DEA, are most often health care institutions and individual regions, sometimes individual medical services are evaluated. It was proposed for the first time Charnes et al. (1978) in 1978, and then refined by many scientists (e.g. Banker, 1984).

An important aspect of DEA application is the orientation of conclusions and potential decisions to input or output, that is, which indicators, input or output, are the object of decision-making. An input-oriented model keeps the current level of activity constant and minimizes inputs (e.g., resources), while an output-oriented model maximizes activity while keeping that amount of inputs constant. Equally important is the aspect of considering the factors influencing the transformation of inputs into outputs.

In addition, the general level of development of the country has a significant impact on the set of indicators for the DEA model. For example, per capita income is not an important factor for highly developed countries, but it is very important for developing ones.

For countries with a low and medium level of development, the following indicators are proposed for use in the DEA model: input (number of health workers, number of beds, number of equipment and facilities), output (number of outpatient and emergency visits, number of discharged patients), factors, that influence (the total population of the region, the share of the urban population, GDP per capita, the specific weight of doctors and beds in primary care facilities).

The first non-parametric performance evaluation models Charnes, Cooper, Rhodes predict constant returns to scale, but later Banker, Charnes, Cooper included variable returns to scale to account for establishments that do not operate at their optimal scale (Caves et al., 1982). This factor is particularly important for Ukraine, where the choice of primary care institution depends mainly on the patient, and therefore, it is quite difficult to assess the need for medical services for a certain region. In such cases, management models of primary care facilities are mainly input-oriented rather than output-oriented, while output indicators are of primary interest for developed countries.

The problem of using the non-parametric DEA model in Ukrainian practice begins with determining the appropriateness of the primary evaluation parameters for use in the version of the DEA model intended for the health care sector. Simply put, to what extent indicators, which are currently traditionally calculated by PHCF, can serve as a baseline for use in DEA. Models like DEA can provide a useful result when processing primary data – remove the influence of "white noise", remove the influence of statistical outliers, identify a trend, smooth its parameters to more convenient ones and, most importantly, identify and measure the influence of significant factors on the trend – only if presence of probabilistic relationship between primary indicators. If the array of primary indicators does not meet this requirement, the DEA model will not be able to realize its potential. It is

for this reason that the DEA model is not implemented in Ukrainian practice.

Analysing the essence of the specified methods, it can be understood that the world practice of evaluating the effectiveness of health care institutions is based on the application of an approach similar to the evaluation of efficiency by production function, where input, output and impact factors are evaluated separately. The modern adaptation of this approach specifically to the field of health care consists only in a specific interpretation of influencing factors. For example, in the study (Margaret et al., 2018) it is proposed to evaluate the efficiency and quality of the health care system in the form of inputs (manpower, tools, equipment, premises, etc.), care processes (adherence to recommendations, communication, etc.) and results (morbidity, mortality, coverage, etc.). That is, with this approach, indicators of care processes become influencing factors. The authors of this study emphasize the difficulty of determining the methods of evaluating efficiency in the health care system and the even greater difficulty of forming an array of initial data, which in aggregate could provide the necessary statistical reliability and reliability of the evaluation results. Therefore, they recommend looking at possible sources of information for evaluation much more broadly (Table 1).

Table 1. Possible sources of initial information for evaluation of efficiency and quality in the health care system

Data sources	Possible areas of assessment and analysis
Formal administrative data (for example, based on helsi.me and nszu.gov.ua)	Control of the operation of the institution and its management; health monitoring at the community and regional level; consequences of medical care for the health of the population.
Medical cards (including electronic)	Control of the operation of the institution and its management; determination of medical and clinical care needs; health monitoring at the community and regional level.
Population survey	Studies of both users and non-users of the health care system; study of patients' experiences regarding referrals and results of medical and clinical care; study of the degree of coverage of the needs of the population by HCF, confidence and economic benefit; the opportunity to practice innovative assessment methods on the population.
Evaluation of material objects	Assessment of workforce, tools, equipment, funding sources for multi-level benchmarking; study of the user's point of view of material objects in the health care system.
Patient registers	Tracking patient-reported experiences and measuring outcomes over time.
System of registration of acts of civil status	Population health monitoring for forecasting and planning.

**Source: compiled by the authors based on (Margaret et al., 2018).*

So, if it is assumed that all performance evaluation methods are either comparative or standardized, the main existing problem of evaluating primary care facilities is the lack of relevant standardized approaches. Conventionally speaking, this is a worldwide problem, which is associated with the significant complexity of determining the relationship between the input and output factors of the operational process in health care institutions.

The unsolved problem remains the inconsistency of the arrays of primary data for the assessment and analysis of the effectiveness of primary care facilities and “secondary” economic and statistical models of processing these data for the purpose of useful information support for the actions of the management of the facilities. And the

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main part of the problem lies precisely in the structure and content of primary data, which do not fit any model of further processing due to the non-compliance of the primary data array collection system with the key requirements and principles of the formation of such arrays.

The analysis of scientific research in the field of evaluating the effectiveness of HCF leads to two key conclusions. First, any assessment of health care institutions is indirect, indirect, and, accordingly, probabilistic, since the system's input and output indicators are not functionally related. Secondly, an adequate methodology for evaluating the effectiveness of health care institutions in itself is not a guarantee of successful management of this effectiveness – first of all, the results of evaluation and analysis must reach agents who are able and authorized to use it to implement changes in the health care system. For this, the evaluation method should be integrated into the chain of decision-making, within a certain environment, starting from the principles of determining the state policy in the field of health care and ending with public control over the activities of health care institutions.

Results

Prior to the medical reform in Ukraine, primary care planning was carried out at the regional level and consolidated at the national level. This planning was part of budget planning in the country and was not part of participatory management processes at the level of individual communities. In line with this, the policies and objectives of primary health care were centralized and little relevant to the needs of the community. Instead, due to decentralization, the state tried to achieve unified forms of state control, controllability of risks and responsibility of management of institutions.

This approach neglected opportunities for community engagement and empowerment, as well as strengthening local health systems through innovative and rapid interventions.

The medical reform made it possible to approach the requirements of the "Astana Declaration", where PHCF is based on three key principles: (1) primary medical care and basic functions of public health as the core of integrated medical services; (2) empowered people and communities; and (3) multisectoral policies and actions (Declaration of Astana, 2018). But, strangely enough, the medical reform in Ukraine, despite the intentions of approaching world standards, on the contrary made it difficult to evaluate the effectiveness of PHCF and added a number of global problems to the evaluation. If in the pre-reformed health care system there were mainly methodological and methodological difficulties of evaluation, then institutional ones have been added to them at the moment.

One of the key reasons for the methodological and methodological difficulties of the assessment is the too centralized management of primary care facilities. This led and leads to an overestimation of the importance of entry indicators compared to others. Input indicators mainly consist of resource and financial indicators. In practice, this means that in Ukraine there is too much interest in the analysis of the indicators of the costs of primary care institutions and the efficiency of the institution's activity is replaced by the efficiency of the use of costs.

It is impractical to limit the assessment of the effectiveness of PHCF only to the basis of cost studies. Many studies, in particular (Hollingsworth, 2003; Schneider et al., 2021; Vande Maele et al., 2019) indicate that it is almost impossible to establish a cause-and-effect relationship between PHC spending and public health outcomes. It is generally recognized that the effectiveness of PHCF spending and trends in that effectiveness are currently unknown and that there is no statistically significant relationship between PHCF spending and other indicators of broad health benefits, such as mortality among adults of any age, the burden of infectious and non-communicable diseases and the index of effective coverage is not found (Vande Maele, 2019; Langlois et al., 2020). Each country has its own cost estimation algorithms and

techniques based on national data collection systems.

With regard to institutional complexities, the publication by a team of authors led by Margaret E. Kruk notes: "…it is proposed to evaluate health care systems primarily by their impact, including improving health and its equitable distribution; on people's trust in their health system; on their economic benefit, and care processes consisting of competent care and positive user experience. The foundations of high-quality health systems include the population and its health care needs and expectations, health sector governance and cross-sector partnerships, platforms to deliver health care, the number and skills of the workforce, and the tools and resources, from drugs to data. High-quality health systems must be based on four values: they are for people, they are equitable, they are sustainable and they are effective" (Margaret et al., 2018, p. 1196). Simply put, almost all the evaluative characteristics proposed for use in the health care system are institutional. On their basis, the institutional interaction is evaluated, first of all, according to indicators related to input and output, as well as factors of influence in the system. This determines the exceptional value of the evaluation results, but makes it very difficult to carry out.

It should be stated that a clear model of the institutional relations of the primary care institution and the surrounding environment should be the basis for determining a certain methodology or technology for evaluating the effectiveness of primary care institutions in Ukraine. That is, before evaluating something, you need to understand who is the user of specific evaluation results. And, conversely, until the agents of institutional interaction are precisely defined, it is not clear what needs to be evaluated. This is a movement in a circle until the institutional matrix of the activity of the primary care facility is formed.

So, returning to the influence of the institutional environment of an HCF on the technology of evaluating its activity, it should be noted that an integral feature of this assessment will be the difference and, in many cases, the incomparability of the properties of a particular institutional environment of a particular primary care institution. In turn, this makes it critically difficult or altogether impractical to create universal evaluation methods for any cases of the institutional environment. And this is a global problem. Many methods of high-quality evaluation of the activity of health care institutions within a certain space have been developed, but the evaluation results are very difficult to compare with each other. But in developed countries, the task of comparing territories or communities is secondary, and solving the needs and achieving the goals of a specific community (or territory) is primary and key.

The structuring of the institutional environment of the primary care institution should be based on the possibilities of influence of individual institutions on the functions performed by the primary care institution. Based on the analysis of institutional policy in Ukraine (Halhash et al., 2020; Morhachov et al., 2021), in the table 2, we present a typical set of functions of a primary care facility. In reality, of course, there are more of them, but to demonstrate the principle, let's stop at this set.

Table 2. Typical functions of a primary care facility

Function	Function content
Medical	Provision of medical services
Social	Ensuring employment
Regional	Participation in the social development of the community where the institution is located
Resource and technological	Exchange and use of resources, technologies and methods of activity
Budget and tax	Execution of budgets of different levels
Innovative	Initiation, genesis and promotion of innovations
Stabilizing	Ensuring sustainability of the population's health
Educational qualification	Increasing the competence of employees by acquiring new knowledge, skills, and experience
Financial and investment	Formation of financial flows related to lending, investing, etc

**Source: compiled by the authors*.

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The institutional environment influences the mechanisms of implementation of certain functions through institutional pressure or institutional interaction. At the same time, the types of influence are also different.

Considering the prevailing in Ukraine division of evaluation characteristics into indicators of medical, social or economic efficiency, in which priority is given to indicators of comparison of costs and results, the author forms a hypothesis regarding the significant complexity of DEA application based on the total number of primary indicators calculated by primary care institutions.

In order to test the hypothesis regarding the interrelationship of the dynamics of individual indicators, which are the objects of functional or statistical reporting of public administration bodies in the field of health care and PHCF, a calculation experiment was conducted. The essence of the experiment is to compare, with the help of correlation, the trends of the behaviour of the most meaningful indicators, detailed by regions of Ukraine, which is one of the simplest types of parametric evaluation, which is more complex in terms of algorithms, but much easier to interpret the results. The purpose of the experiment is to establish or not to establish a statistically significant relationship between the behaviour of indicators based on the application of a simple statistical method.

The indicators are taken for 2021 in order to avoid the extreme impact of martial law on their level. Also, indicators are pre-divided into 3 groups representing input, output and influencing factors in the management system in the context discussed above. This will allow to investigate the interrelationship of the behaviour of indicators both within groups and between groups. The set of indicators is shown in figure 1.

Indicators of 2021

Entrance	Factors of influence	Exit
1.1 Amount of the contract in medical guarantee program-2021, UAH	2.1 Availability of primary medical care doctors (persons per 100,000 population)	3.1 Share of people who submitted declarations about choosing a primary medical care doctor, % of the population
1.2 Package of services No. 1 "Primary medical care", UAH	2.2 Density of places of primary medical care provision (units per 100,000 population)	3.2 General use of primary medical care services, cases of at least 1 appeal per year
1.3 Package of services No. 49 "Ensuring the preservation of personnel potential for the provision of medical care", 2022, UAH	2.3 Density of primary medical care centres (units per 100,000 population)	3.3 Total number of prescriptions issued in 2021, pcs.
1.4 Package of services No. 9 "Prevention, diagnosis, monitoring, treatment and rehabilitation of patients in outpatient settings", UAH	2.4 Average monthly salary, total, UAH	3.4 Total vaccinations in 2021, pcs.
1.5 Income under the medical guarantee program, UAH	2.5 Average monthly wages, doctors, UAH	3.5 Number of deaths of men from cerebrovascular diseases aged 30-59, cases per 100,000 men of the corresponding age
1.6 Labour costs, UAH	2.6 Average per capita income of the population for	3.6 Number of deaths of women from cerebrovascular diseases aged 30-59,

	the year, UAH	cases per 100,000 women of the corresponding age
1.7 Capital investments, UAH	2.7 Population expenditures on health care, % of total expenditures	3.7 Number of deaths of women from malignant neoplasm of the breast aged 30-59 years, cases per 100,000 women of the corresponding age
	2.8 Number of existing populations in the region, persons	

Figure 1. A set of indicators selected to determine a potential relationship

**Source: compiled by the authors. Sources of data by indicators: dashboards of the National Health Service of Ukraine (https://edata.e-health.gov.ua/e-data/dashboard) and the State Statistics Service of Ukraine (https://www.ukrstat.gov.ua/).*

In figures 2 and 3 show the correlation field – the results of the calculation of paired correlation coefficients between all the indicators used. To simplify perception, various fragments of the intersection of rows and columns of the correlation field are highlighted with a gray gradient. Accordingly, along the main diagonal of the field, there is a cascade of fragments, inside which the correlation coefficients between indicators of the same group: input, output or influence factors are given. The other three fragments, to the left of the main diagonal, symbolize the relationship between the indicators of different groups. Also, for simplification, the correlation field is displayed in two versions, with filtered correlation coefficients: in figure 2 – coefficients greater than 0.7, in figure 3 – coefficients less than 0.

Indicator numbers																						
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	3.1	3.2	3.3	3.4	3.5	3.6	3.7
1.1	1.00																					
1.2	0.98	1.00																				
1.3			1.00																			
1.4	0.93	0.86		1.00																		
1.5	1.00	0.98		0.92	1.00																	
1.6	0.98	0.96		0.92	0.98	1.00																
1.7	0.84	0.84		0.71	0.84	0.86	1.00															
2.1								1.00														
2.2									1.00													
2.3								0.74		1.00												
2.4											1.00											
2.5											0.87	1.00										
2.6	0.71			0.72	0.70	0.78							1.00									
2.7														1.00								
2.8	0.73	0.72			0.74	0.75									1.00							
3.1								0.88								1.00						
3.2																	1.00					
3.3	0.86	0.85		0.80	0.86	0.79	0.73											1.00				
3.4	0.95	0.93		0.90	0.95	0.98	0.85						0.85					0.72	1.00			
3.5																				1.00		
3.6																				0.94	1.00	
3.7																0.81				0.79	0.73	1.00

Figure 2. The correlation field filtered by the correlation coefficient r > 0.7

**Source: calculated by the authors.*

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Analysing the data of figure 2 several conclusions can be drawn. First, there is a weak relationship between the indicators included in the sample as a whole. Cases of a statistically proven relationship, when the coefficient is greater than 0.7, are few and mainly relate to input indicators, in particular, cost indicators. This is explained by a simple functional relationship between value indicators. For example, the cost of services for individual packages is mechanistically dependent on the total amount of medical guarantee program contracts, and the basis for the distribution of amounts between services is universal and independent of the specifics of one or another region. Secondly, there is a weak relationship between the indicators of entry and exit, and the indicators of influence and exit factors. There - where, in principle, it should be. Correlation coefficients greater than 0.7 are few in these intersection zones. The only exception is the high correlation between entry rates and the number of prescriptions and vaccinations, which is also explained by the mechanistic approach to determining the cost of medical guarantee program and individual services due to the population in the region.

Indicator numbers																					
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	3.1	3.2	3.3	3.4	3.5	3.6	3.7
1.1																						
1.2																						
1.3																						
1.4																						
1.5																						
1.6																						
1.7																						
2.1																						
2.2	-0.46	-0.40		-0.50	-0.44	-0.47	-0.38															
2.3	-0.21	-0.16		-0.24	-0.21	-0.26	-0.25															
2.4								-0.13	-0.35	-0.41												
2.5			-0.14					-0.38	-0.41	-0.56												
2.6									-0.33	-0.13												
2.7		-0.06	-0.14		-0.01			-0.07	-0.34	-0.04	-0.16											
2.8			-0.02					-0.45	-0.66	-0.56				-0.18								
3.1				-0.01							-0.25	-0.41			-0.53							
3.2			-0.15					-0.22	-0.53	-0.34						-0.20						
3.3								-0.07	-0.39	-0.23		-0.01										
3.4									-0.49	-0.29												
3.5											-0.26	-0.26			-0.43							
3.6											-0.21	-0.16			-0.38							
3.7											-0.07	-0.26			-0.32							

Figure 3. The correlation field filtered by the correlation coefficient r < 0

**Source: calculated by the authors.*

In figure 3, the given correlation field filtered by the correlation coefficient r < 0. As we can see, among the negative correlation coefficients there are no statistically significant ones, i.e. r < - 0.7. Not a single pair of the investigated indicators is in a reliable feedback relationship. In some cases, this

relationship is paradoxical. For example, the amount of medical guarantee program funding and the density of primary medical care places and institutions are inversely related. That is, the lower the density of primary medical care provision places, the greater the funding of these institutions.

So, in general, the weak relationship between the indicators of both the same group and different groups indicates that only a retrospective assessment can be based on them, which after the fact shows the positive or negative dynamics of changes in an individual indicator. It is impossible to use these indicators for perspective assessment, in particular for management in the health care system, because it is impossible to determine the patterns of influence of changes in regulated indicators on changes in effective indicators.

In other words, even with a wide sample of indicators for analysis, the results of this analysis indicate the absence of stable trends in the dependence of indicators characterizing input conditions with effective indicators. That is, this dependence mathematically simply does not exist, although it is clear that logically it should exist.

Based on the findings of Margaret et al. (2018), they should be supplemented with domestic national features. The presence of a very large number of indicators for evaluation, together with an insignificant relationship between the behaviour of the indicators with each other, indicates that the dominant principle of the selection of indicators is the statistical availability and regularity of the initial data. That is, the selection of indicators is based mostly on the possibility of providing them with raw data and understandable calculation algorithms. At the same time, there is an abuse of the fact that, firstly, the principle is applied - the more indicators, the better, and, secondly, cost effectiveness indicators are excessively used (according to Vande Maele, Xu, Soucat et al. (2019) for countries with a low-income level is an important aspect that distorts the evaluation results).

Ultimately, this leads to the filling of a very specific medical field of analysis with non-specific, but simply statistically universal indicators. That is, the key is the simplicity of calculating indicators, but not the ability to analyse them and draw useful conclusions. And in the end, very important aspects of providing primary care remain without appropriate analytical attention and, as a result, insufficient attention is paid to these aspects in the formation and improvement of state policy in the field of health care.

Conclusions

Each primary care institution exists in a complex and unique institutional environment. The assessment of the institution's performance should reflect the parameters of the relationship with as many participants as possible in the surrounding environment. Basing this assessment only on the information whims of hierarchically higher institutions, without understanding why certain indicators are calculated, is a counterproductive way. Through the assessment of effectiveness, the primary care institution must understand its place and its result in the community or territory, and thanks to this, improve the performance of its main social function - care for the health of the population.

When forming a set of indicators for evaluating the effectiveness of the PHCF activity, there is an abuse of input indicators and impact factors, with a clear insufficiency of output indicators - or effectiveness. Among the input indicators, a particularly overloaded group is the various cost effectiveness indicators, which are mostly functionally interdependent. With this in mind, the number of output indicators used should be increased, and the input should be reduced accordingly. A separate problem of this is that very few output indicators are used when evaluating the performance of the management systems of hazardous waste and they need to be additionally constructed using the accumulated world experience.

The used aggregates of indicators are not structured according to their users. It remains unclear what indicators are the basis for decision-making by those or other persons making such decisions. Most of the traditionally used indicators are not intended for use by the management of PHCF institutions, but for external users - public authorities, local governments. Or it is not intended for anyone at all - the indicator simply does not have

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a user; its value is purely statistical. The problem is aggravated by the excessive dependence of the set of indicators on the national evaluation policy and tools for recording the original information. Indicators are not created or added to the evaluation system at the local level, although local circumstances are very important and sometimes decisive. The way to solve this problem is the structuring of indicators by directions of institutional interaction at the local level and the uniform filling of the evaluation system with appropriate and adequate indicators for each direction. At first glance, the complexity of this approach is that completely different sets of indicators will be formed for primary care facilities for different local conditions. But this is a generally accepted world practice. There are indicators that reflect relations according to the institutional direction - the state, and they should be universal. And there are indicators that reflect relations with the local institutional environment, and they will be peculiar, because this environment is unique.

In the general context, the problem that the results of performance evaluation do not become the basis of accountability of the management of primary care institutions needs to be solved. Only a small number of the indicators used relate to the results of the activities of the heads of primary care institutions. But, even in this case, indicators do not become the basis of management accountability. This devalues the analytical effort. If the evaluation system does not serve as a basis for personnel policy in particular, there is a danger that the indicators will simply "draw" because no one is responsible for their level. At the same time, the evaluation system will be sufficiently valuable. Linking the key performance indicators to the management's KPI will force everyone to pay much more attention to the formation of aggregates and the calculation of indicators.

References

Bakhmat, N., Voropayeva, T., Artamoshchenko, V., Kubitskyi, S., & Ivanov, D. (2022). Quality Management in Higher Education in Terms of Sustainable Development. *International Journal for Quality Research*, *16*(4), 1107-1120. http://dx.doi.org/10.24874/IJQR16.04-10

Banker, R. D., Charnes, A., & Cooper, W. W. (1984). Some models for estimating technical and scale inefficiencies in data envelopment analysis. *Management science*, *30*(9), 1078–1092. https://doi.org/10.1287/mnsc.30.9.1078

Bosniuk, V., Ostopolets, I., Svitlychna, N., Miroshnichenko, O., Tsipan, T., & Kubitskyi, S. (2021). Social Content of Psychological Specialists' Professional Activity. *Postmodern Openings*, *12*(1), 01-20. https://doi.org/10.18662/po/12.1/242

Caves, D. W., Christensen, L. R., & Diewert, W. E. (1982). The economic theory of index numbers and the measurement of input, output, and productivity. *Econometrica: journal of the Econometric Society*, 1393-1414. https://doi.org/10.2307/1913388

Charnes, A., Cooper, W. W., & Rhodes, E. (1978). Measuring the efficiency of decision-making units. *European journal of operational research*, *2*(6), 429–444. https://doi.org/10.1016/0377-2217(78)90138-8

Declaration of Astana. Geneva: World Health Organization. 2018. Available from: https://apps.who.int/iris/bitstream/handle/10665/328123/WHO-HIS-SDS-2018.61-eng.pdf?sequence=1&isAllowed=y

Gažarová, M., Hačková, L., Sharlovych, Z., Lenártová, P., Kijovská, M., Pastrnáková, J., & Kutiuhova, T. (2025). Weight-Adjusted Waist Index as a New Useful Tool for Assessing Body Composition and Risk of Metabolic Disorders in Adult Women. *Applied Sciences (2076–3417)*, *15*(3). https://doi.org/10.3390/app15031335

Gryshchenko, I., Ganushchak-Efimenko, L., Hnatenko, I., & Rębilas, R. (2023). Management of environment design of the development of innovative entrepreneurship at integrated structures under the conditions of post-war reconstruction. Financial & Credit Activity: Problems of Theory & Practice, *5*(52), 341-352. https://doi.org/10.55643/fcaptp.5.52.2023.4199

Halhash, R., Semenenko, I., Ovcharenko, I., & Borova, G. (2020). Innovative forms of realization of regional social policy by organizing public dialogue and communication in conditions of post-conflict transformation in Eastern Ukraine. *European Journal of Sustainable Development*, *9*(2), 391–391. https://doi.org/10.14207/ejsd.2020.v9n2p391

Hnatenko, I., Bebko, S., Ievseitseva, O., Kvita, H., & Zos-Kior, M. (2024). Market analysis of the renewable energy market of Ukraine in the context of changes in financial and economic processes. Financial and credit activity: problems of theory and practice. Volume 5 (58), 446-459. https://doi.org/10.55643/fcaptp.5.58.2024.4576

Hnatenko, I., Kuksa, I., Naumenko, I., Baldyk, D., & Rubezhanska, V. (2020). Infrastructure of innovation enterprise: features of formation and regulation in modern market conditions. *Management Theory and Studies for Rural Business and Infrastructure Development*, *42*(1), 97-104. https://doi.org/10.15544/mts.2020.10

Hollingsworth, B. (2003). Non-parametric and parametric applications measuring efficiency in health care. *Health care management science*, *6*, 203–218. https://doi.org/10.1023/A:1026255523228

Hollingsworth, B., Dawson, P. J., & Maniadakis, N. (1999). Efficiency measurement of health care: a review of non-parametric methods and applications. *Health care management science*, *2*, 161–172. https://doi.org/10.1023/A:1019087828488

Kruk, M. E., Gage, A. D., Arsenault, C., Jordan, K., Leslie, H. H., Roder-DeWan, S., ... & Pate, M. (2018). High-quality health systems in the Sustainable Development Goals era: time for a revolution. *The Lancet Global Health*, *6*(11), e1196-e1252. https://doi.org/10.1016/s2214-109x(18)30386-3

Kubitskyi, S., Shorobur, I., Yevdokymova, N., Vlasiuk, T., & Shevchuk, L. (2023). Development of higher education institutions in the current conditions. *Cadernos de Educação Tecnologia e Sociedade*, *16*(se2), 119-128. https://doi.org/10.14571/brajets.v16.nse2.119-128

Langlois, E. V., McKenzie, A., Schneider, H., & Mecaskey, J. W. (2020). Measures to strengthen primary health-care systems in low-and middle-income countries. *Bulletin of the World Health Organization*, *98*(11), 781. https://doi.org/10.2471/blt.20.252742

Mazur, N., Khrystenko, L., Pásztorová, J., Zos-Kior, M., Hnatenko, I., Puzyrova, P., & Rubezhanska, V. (2021). Improvement of Controlling in the Financial Management of Enterprises. *TEM Journal: Technology, Education, Management, Informatics*, *10*(4), 1605-1609. https://doi.org/10.18421/TEM104-15

Morhachov, I., Ovcharenko, I., Ivchenko, Y., Buchniev, M., Tkachenko, N., & Derzhak, N. (2021). Creation of Investment Funds in Ukraine by Individuals as a Criterion for Sustainable Development of the Country's Economy. *European Journal of Sustainable Development*, *10*(4), 271-271. https://doi.org/10.14207/ejsd.2021.v10n4p271

Mykhailichenko, M., Lozhachevska, O., Smagin, V., Krasnoshtan, O., Zos-Kior, M., & Hnatenko, I. (2021). Competitive strategies of personnel management in business processes of agricultural enterprises focused on digitalization. Management Theory and Studies for Rural Business and Infrastructure Development, 43(3), 403–414. https://ejournals.vdu.lt/index.php/mtsrbid/article/view/2519

Mykhalchenkova, O., Balanchuk, I., & Sharlovych, Z. (2024). Ukristei is an information hub for innovative developments, as the main factor in business dynamics. *Zeszyty Naukowe Wyższej Szkoły Ekonomiczno-Społecznej w Ostrołęce*, *52*(1), 21-27. http://dx.doi.org/10.58246/sj-economics.v52i1.651

Pelone, F., Kringos, D. S., Romaniello, A., Archibugi, M., Salsiri, C., & Ricciardi, W. (2015). Primary care efficiency measurement using data envelopment analysis: a systematic review. *Journal of medical systems*, *39*, 1–14. https://doi.org/10.1007/s10916-014-0156-4

Prokopenko, O., Martyn, O., Bilyk, O., Vivcharuk, O., Zos-Kior, M., & Hnatenko, I. (2021). Models of State Clusterisation Management, Marketing and Labour Market Management in Conditions of Globalization, Risk of Bankruptcy and Services Market Development. *International journal of computer science and network security: IJCSNS*, *21*(12), 228-234. https://doi.org/10.22937/IJCSNS.2021.21.12.34

Prylipko, S., Vasylieva, N., Kovalova, O., Kulayets, M., Bilous, Y., & Hnatenko, I. (2021). Modeling of Regional Management of Innovation Activity: Personnel Policy, Financial and Credit and Foreign Economic Activity. *International Journal of Computer Science & Network Security*, *21*(11), 43-48. https://doi.org/10.22937/ijcsns.2021.21.11.6

Purdenko, O., Artyushok, K., Riazanova, N., Babaiev, I., Kononenko, A., Lepeyko, T., & Zos-Kior, M. (2023). Financial management of innovative eco-entrepreneurship. *Management Theory and Studies for Rural Business and Infrastructure Development*, *45*(2), 152-165. https://doi.org/10.15544/mts.2023.16

Schneider, M. T., Chang, A. Y., Crosby, S. W., Gloyd, S., Harle, A. C., Lim, S., ... & Dieleman, J. L. (2021). Trends and outcomes in primary health care expenditures in low-income and middle-income countries, 2000–2017. *BMJ global health*, *6*(8), e005798. https://doi.org/10.1136/bmjgh-2021-005798

Semenov, A., Kuksa, I., Hnatenko, I., Sazonova, T., Babiy, L., & Rubezhanska, V. (2021). Management of Energy and Resource-Saving Innovation Projects at Agri-Food Enterprises. *TEM Journal: Technology, Education, Management, Informatics*, *10*(2), 751-756. https://doi.org/10.18421/TEM102-32

Sharlovych, Z., Chutova, N., Abenova, N., & Aringazina, R. A. (2025). Understanding Professional Risks and Quality of Life Among Medical Workers: A Pilot Study in Ukraine. *West Kazakhstan Medical Journal*, *67*(1), 112-122. https://doi.org/10.18502/wkmj.v67i1.16385

Shumilova, I., Kubitskyi, S., Bazeliuk, V., Rudyk, Y., Hrechanyk, N., & Rozhnova, T. (2023). The System of Forming the emotional and ethical Competence of the Future education Manager in the conditions of transformational changes. *Ad Alta-Journal of Interdisciplinary Research*, *13*(2), 82-89. https://ep3.nuwm.edu.ua/28475/

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eISSN 2345-0355. 2025. Vol. 47. No. 2: 304-318
Article DOI: https://doi.org/10.15544/mts.2025.24

Vande Maele, N., Xu, K., Soucat, A., Fleisher, L., Aranguren, M., & Wang, H. (2019). Measuring primary healthcare expenditure in low-income and lower middle-income countries. *BMJ Global Health*, *4*(1), e001497. DOI: https://doi.org/10.1136/ bmjgh-2019-001497

Voznyuk A., Kubitskyi S., Balanovska T., Dorofyeyev O., & Chip L. (2022). Synergetic simulation of managing processes in educational sphere in the contest of temporary self-ruled managerial target teams' application. *Financial and Credit Activity Problems of Theory and Practice*, 3(44), 317–327. https://doi.org/10.55643/fcaptp.3.44.2022.3749 https://fkd.net.ua/index.php/fkd/article/view/3749/3602

Zhyvko, Z., Morhachov, I., Zhelikhovska, M., Artiukh-Pasiuta, O., Hnatenko, I., Skripnik, V., & Yanechko, S. (2024). The Influence of the US Stock Market on the Institutional Security Strategy of the Management of Innovative Development. *Management Theory and Studies for Rural Business and Infrastructure Development*, *46*(1), 104-111. https://doi.org/10.22937/IJCSNS.2024.24.11.11